

DISCUSSION OF THE CLAIMS

Claims 1, 3-38 and 40-42 are pending in the present application. The previously presented claims are amended for matters of form. Claims 2 and 39 are canceled claims. Claims 40-42 are new claims. Support for new Claims 40 and 41 is found in Figure 1. Support for new Claim 42 is found in paragraphs [0047] and [0084] of the PG publication corresponding with the present application, i.e., U.S. 2006/0175229. Applicants submit that it is evident to those of skill in the art based on the aforementioned paragraphs and Figure 1 of the present application that the pressure of the high pressure separation pre-step is carried out at a pressure between the pressure of the hydrotreatment and the hydrogenating post-treatment.

No new matter is believed to have been added by this amendment.

REMARKS/ARGUMENTS

Applicants thank the Office for withdrawing the finality of the previous Office Action and withdrawing the Notice of Abandonment. The Office now rejects the claims as obvious over a combination of Marchionna, van Klinken and Taylor.

The presently claimed invention includes subjecting the reaction product formed in a hydrotreatment reactor to high pressure separation to form an overhead stream (i.e., the “lighter fraction” of Claim 1) and a bottoms stream (i.e., the “heavier fraction” of Claim 1). The high pressure separation is carried out before treating the heavier fraction in a distillation or flash unit. This aspect of the invention is apparent in Figure 1 which shows the high pressure separation (“HPSep”) interposed between hydrotreatment (i.e., “HT”) and secondary hydrogenation post-treatment (i.e., “HDT C5-350”). Figure 1 of the original specification is reproduced below for convenience.

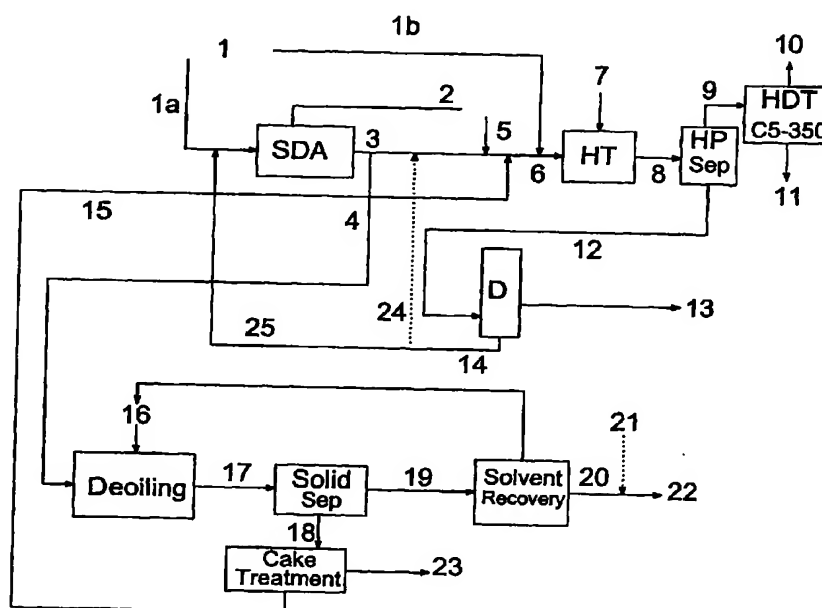


Fig. 1

Not only is a second hydrotreating of a light fraction obtained from a high pressure separator not disclosed in the Marchionna (U.S. 5,923,090) patent, the other cited art, i.e., van

Klinken (U.S. 4,039,429) and Taylor (U.S. 5,124,026) fail to suggest the inclusion of such a step in the Marchionna process.

Both the Taylor and van Klinken processes are substantially different from the presently claimed process. Those of skill in the art would not be led to modify the Marchionna process to arrive at the presently claimed invention according to the Taylor and van Klinken disclosure. The Taylor and vanKlinken processes include steps and/or process conditions that are not compatible with modification of Marchionna to arrive at the presently claimed invention.

For example, Taylor describes a process which uses an ebullated reactor or a fixed bed reactor (see the paragraph bridging columns 7 and 8 and column 8, lines 26-28 of Taylor). Taylor makes it clear that hydrotreating is carried out in a reactor such that the catalyst remains in the reactor (see for example column 7, lines 59-66). This stands in stark contrast to the presently claimed invention in which a hydrotreatment reaction product containing catalyst (i.e., a catalyst dispersed therein) is further subjected to high-pressure separation and distillation.

Taylor emphasizes the difficulties that arise when a hydrotreated reaction product contains solids. Taylor discloses:

Solids formed during resid hydrotreating cause deposition and poor flow patterns in the reactors, as well as fouling, plugging, and blocking of conduits and downstream equipment. Oils laden with solids cannot be efficiently or readily pipelined. Hydrotreating solids can foul valves and other equipment, and can build up insulative layers on heat exchange surfaces reducing their efficiency. Buildup of hydrotreated solids can lead to equipment repair, shut down, extended down time, reduced process yield, decreased efficiency, and undesired coke formation.

See column 2, lines 37-47 of Taylor.

Taylor therefore teaches away from the presently claimed invention. As explained above, the present claims recite a process in which a catalyst-containing hydrotreated product

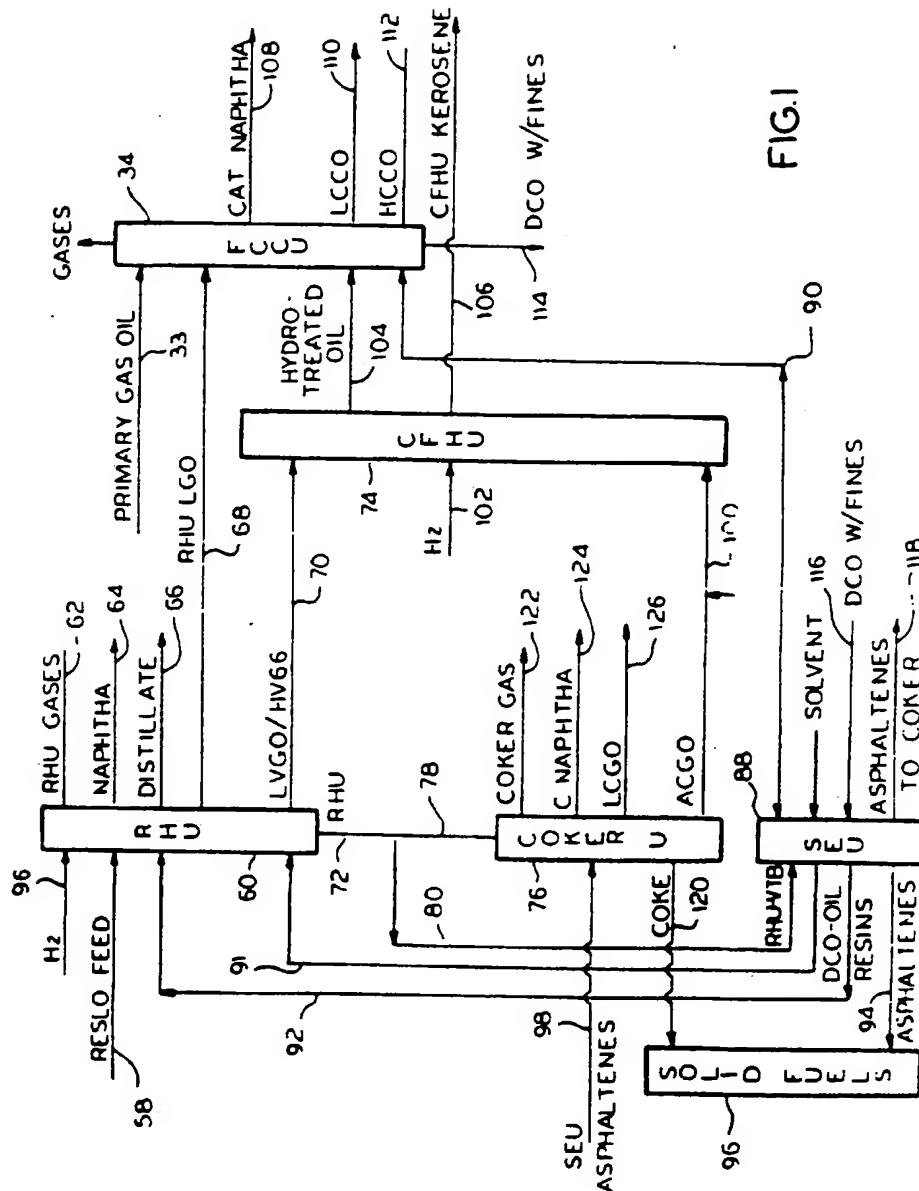
is subjected to further process steps including high pressure separation and distillation.

Taylor makes it clear that such a process, i.e., a process in which a solids-containing hydrotreated product is subjected to further processing, would suffer from severe problems.

Applicants submit that those of skill in the art would have no expectation that modifying the Marchionna process in view of Taylor would provide an effective or operable process for converting heavy feedstocks. In fact, to the contrary, those of skill in the art, reading the Taylor patent, would be left with the impression that the solids of the hydrotreated reaction product (i.e., the catalyst) of the present claims and/or the Marchionna process would cause severe problems in any down-stream treatment such as high pressure separation, distillation or secondary hydrotreatment.

Applicants thus submit that the Office's combination of Marchionna in view of Taylor and van Klinken is not supportable in view of Taylor's contradictory disclosure with regard to modifying a solids-containing hydrotreatment process.

Taylor is further different with respect to the presently claimed and Marchionna processes with regard to the high-pressure separation step of the present claims. A schematic of the Taylor process is reproduced below for convenience.



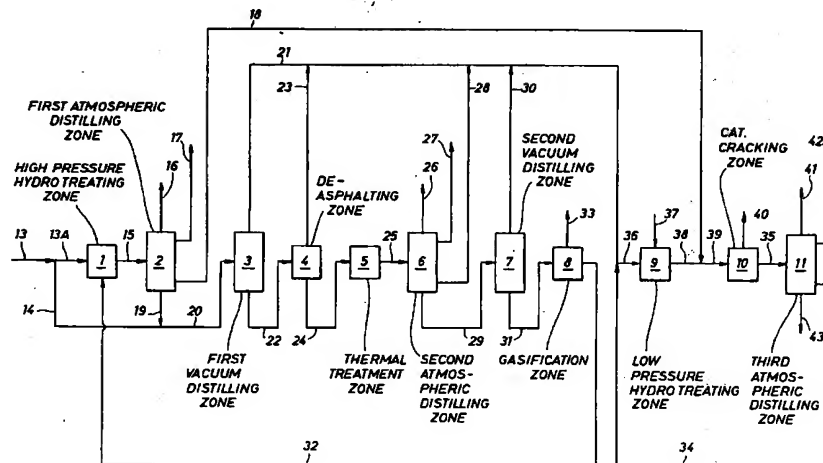
Taylor describes a resid hydrotreating unit as reference no. 60 (i.e., “RHU”). It is readily evident that the RHU unit of the Taylor process is a fractional distillation that forms a series of different product streams (e.g., RHU gases, naphtha, distillate and LVGO/HV66). Only the bottom streams of the Taylor fractional distillation are subjected to a further processing step, i.e., catalytic feed hydrotreating unit (CFHU) identified as reference no. 74). This again stands in stark contrast to the present claims in which a high pressure separation of a hydrotreatment reaction product forms a light fraction and a heavy fraction and only the

light fraction is subjected to secondary hydrogenation post-treatment (see reference nos. 9 and 12 of Figure 1 of the present application describing the light and heavy fractions, respectively, derived from the high pressure separator).

Further in this regard Applicants draw the Office's attention to new dependent Claim 40. The new dependent claim requires that the high pressure separator form only the light stream and heavy stream.

The Taylor process is thus substantially different from the process of the present claims. For example, the chemical composition of the feed stream to the secondary hydrotreatment of the presently claimed invention includes a light fraction whereas the chemical composition of the feed stream fed to the CFHU of the Taylor process is a heavy fraction. The two processes are directly contradictory in this regard. Modifying Marchionna in the manner of Taylor would provide a process that does not adhere to the present claims.

The van Klinken process is likewise substantially different from the presently claimed process with regard to the composition of the feed stream subjected to hydrotreating. For convenience, Figure 1 of the vanKlinken patent is reproduced below:



The van Klinken process includes a first high pressure hydrotreating zone identified by reference no. 1. The hydrotreatment product is subjected to a "first atmospheric distilling" after the first high pressure hydrotreating. Importantly, the overhead products identified by

reference numerals 16 and 17 are not further treated in Figure 1. Instead, it is a bottoms product identified by reference no. 18 that is further subjected to hydrotreating (see reference no. 9).

Again, the process of the cited art differs substantially from the process of the present claims. The composition of the feed stream to secondary hydrogenation post-treatment is different in van Klinken in comparison to the present claims. Those of skill in the art would not be led to modify Marchionna in the manner of either of Taylor or vanKlinken to arrive at the presently claimed invention in view of the fact that the respective processes treat different feed streams of substantially composition in a substantially different manner. Where the presently claimed invention subjects a light fraction overhead to secondary hydrogenation, the Taylor and van Klinken processes subject distillate bottoms fractions to a further hydrotreatment. Those of skill in the art readily recognize that overhead and bottoms fractions are substantially different in chemical composition and physical properties.

Van Klinken is further different from the presently claimed invention for the reason that the first atmospheric distilling carried out on the hydrotreated material is carried out in a different pressure realm than that of the present claims. The present claims carry out a *high pressure* separation whereas the separation of van Klinken is an atmospheric distillation. Applicants draw the Office's attention to new dependent Claim 42 in this regard. The new dependent claim makes it clear that the pressure of the high pressure separation is substantially greater than atmospheric pressure.

This difference in feed streams sent to the secondary hydrotreatment is significant for other reasons. For example, because a light fraction is subjected to secondary hydrogenation in the claimed invention it is possible to efficiently employ high pressure (e.g., the high pressure already present as a function of either or both the first and second hydrotreatment in

the presence of hydrogen gas) the high pressure separation which may be carried out in the presence of high pressure hydrogen. This is not possible in an atmospheric distillation.

Because a light fraction is subjected to secondary hydrogenation in the claimed invention, it is possible to efficiently employ high pressure, e.g., the high pressure already present as a function of either or both the first hydrotreatment in the presence of hydrogen gas, the high pressure separation which may be carried out in the presence of high pressure hydrogen. This is not possible in the Taylor and vanKlinken processes in which a heavy fraction, e.g., a fraction having a high boiling point, is treated, for example, to distillation steps in which a carrier gas and/or reactant gas such as hydrogen is removed.

This of course provides a further efficiency in the claimed invention because hydrogen is already present in the feed stream directed to the secondary hydrogenation. The Taylor and van Klinken processes would require the addition of a high pressure hydrogen stream for any secondary hydrotreatment, a necessity that is eliminated in the claimed invention.

Other advantages that derive from the particular arrangement of steps in the presently claimed invention are outlined in paragraphs [0040]-[0042] of the PG publication of the present application. For example, sulfur-rich feed stocks can be used to form high-value diesel fuel at relatively low sulfur concentrations.

For the reasons discussed above in detail, Applicants submit that those of skill in the art would have no reasonable expectation of success and no motivation to modify the Marchionna process according to either or both the Taylor and van Klinken patents. Applicants thus submit that a *prima facie* case of obviousness has not been established and respectfully request withdrawal of the rejections.

Applicants clarify below comments made in the April 29, 2009 Amendment. For example, on page 13, lines 15-last line, Applicants pointed out that the vanKlinken patent

describes a series of steps contrary to the claimed invention. Applicants point out that the presently claimed invention permits the inclusion of atmospheric distillation, but such atmospheric distillation is not the high pressure separation recited in the present claims. Further, with respect to comments made on page 14, lines 1-9, Applicants point out that processing steps such as decoiling, solvent recovery, cake treatment and the like can optionally be included in the manner set forth in Claims 26-34. However, such steps are only optional and are not required. Thus their recitation in dependent claims.

Obviousness Double Patenting

The Office now newly rejects the claims for double patenting over co-pending applications 10/539,058; 11/311,134; and 11/311,147. The present application is the senior case with respect to the aforementioned co-pending applications. Applicants draw the Office's attention to MPEP § 804(I)(B)(1) which states in relevant part:

If a "provisional" nonstatutory obviousness-type double patenting (ODP) rejection is the only rejection remaining in the earlier filed of the two pending applications, while the later-filed application is rejectable on other grounds, the examiner should withdraw that rejection and permit the earlier-filed application to issue as a patent without a terminal disclaimer.

The claims of both co-pending 10/539,058 and 11/311,134 are rejectable on other grounds. The 11/311,147 application has nothing to do with the present case and is assigned to a different party.

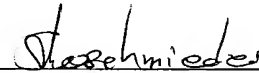
Applicants submit that under the present circumstances, i.e., where the present application is the senior case in view of co-pending applications cited for obviousness-type double patenting, it is appropriate to withdraw the obviousness-type double patenting rejection from the present application and allow the present application to issue as a patent without a Terminal Disclaimer. Further the rejection over the 11/311,147 application should be withdrawn.

Irrespective of the legal status of the present claims for obviousness-type double patenting as described at the MPEP § 804, Applicants reserve the right to file a Terminal Disclaimer to expedite prosecution, if desired.

For the reasons discussed above in detail, Applicants request withdrawal of the rejection and the allowance of all now-pending claims.

Respectfully submitted,

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